

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PCTA9407-2	FOR FURTHER ACTION		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/KR2004/001819	International filing date (day/month/year) 21 JULY 2004 (21.07.2004)	(Earliest) Priority Date (day/month/year) 30 JANUARY 2004 (30.01.2004)	
Applicant Korea Research Institute of Bioscience and Biotechnology et al			

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☒ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☒ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (See Box No. III)

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

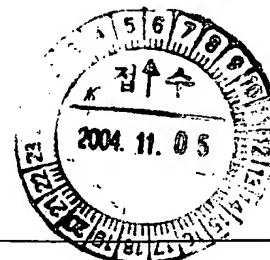
- a. the figure of the drawings to be published with the abstract is Figure No. 5

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

- b. ☐ none of the figure is to be published with the abstract.



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International application No.

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

a. type of material

- ☒ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☒ in written format
☒ in computer readable form

c. time of filing/furnishing

- ☒ contained in the international application as filed
☒ filed together with the international application in computer readable form
☐ furnished subsequently to this Authority for the purposes of search

2. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 11
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

Claim 11 relates to glycoprotein produced by a method according to claim 8 or 9. However, a glycosylation pattern of glycoprotein claimed is not clear(PCT Article 17(2)(a)).

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any addition fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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International application No.
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Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

This invention relates to a novel gene encoding α 1,6-mannosyltransferase involved in outerchain elongation of glycoprotein from *Hansenula polymorpha*, a *Hansenula polymorpha* mutant strain deficient of the gene, and method for producing recombinant glycoprotein by using the mutant.

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 C12N 15/54, C12N 15/04, C12N 9/10**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 C12N 15/54, C12N 15/04, C12N 9/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Patents and Application for Invention
Japanese Patent and Application for InventionElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Delphion, Genbank, Pubmed, CA "(mannosyltransferase) and (yeast)"**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/0137134 A (Tillman U. Gerngross) 26 Sep. 2002, See the whole document	1-10
A	KR 2004/0004089 (Korea Research Institute of Bioscience and Biotechnology) 13 Jan. 2004, See the whole document	7-10
A	Proc. Nat'l Acad. Sci., Vol. 100, No. 9, Apr. 2003, pages 5022-5027, B. K. Choi et al. : "Use of Combinatorial Genetic Libraries to Humanize N-Linked Glycosylation in the Yeast Pichia pastoris"	1-10
A	Glycobiol., Vol. 5, No.7, 1995, pages 671-681, M. F. Verostek et al. : "Mannosyltransferase Activities in Membranes from Various Yeast Strains"	1-10
A	J. Biol. Chem., Vol.273, No.41, Oct. 1998, pages 26298-26304, Y. Chiba et al. : "Production of Human Compatible High Mannose-type (Man5GlcNAc2) Sugar Chains in Saccharomyces cerevisiae"	1-10
A	J. Biol. Chem. Vol.268, No.35, Dec. 1993, pages 26338-26345, Y. Nakanishi-Shindo et al. : "Structure of the N-Linked Oligosaccharides That Show the Complete Loss of a-1,6- polymannose Outer Chain form och1, och1mnn1, and och1mnn1alg3 Mutants of Saccharomyces cerevisiae"	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

26 OCTOBER 2004 (26.10.2004)

Date of mailing of the international search report

27 OCTOBER 2004 (27.10.2004)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHANG, Je Hwan

Telephone No. 82-42-481-8158



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2004/001819

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002/013713 4A	26.09.2002	W00200879A2 NZ0523476A JP2004501642T2 EP1297172A2 CA2412701AA AU0176842A5	03.01.2002 30.04.2004 22.01.2004 02.04.2003 03.01.2002 08.01.2002
KR 2004/0004089		none	